

21)  $\sqrt{(b+7)^2} = \sqrt{5}$

$b+7 = \pm\sqrt{5}$

$b = -7 \pm \sqrt{5}$

22)  $\sqrt{(3y-2)^2} = \sqrt{8}$

$3y-2 = \pm 2\sqrt{2}$

$\frac{3y}{3} = \frac{2 \pm 2\sqrt{2}}{3}$

$y = \frac{2 \pm 2\sqrt{2}}{3}$

23)  $12x^2 = 8x - 1$

$12x^2 - 8x + 1 = 0$

$(6x-1)(2x-1) = 0$

$6x-1=0 \quad 2x-1=0$

$x = \frac{1}{6} \quad x = \frac{1}{2}$

$x = \left\{ \frac{1}{6}, \frac{1}{2} \right\}$

24)  $\sqrt{2}x^2 - 4x + \sqrt{2} = 0$

$a = \sqrt{2} \quad b = -4 \quad c = \sqrt{2}$

$x = \frac{4 \pm \sqrt{(-4)^2 - 4(\sqrt{2})(\sqrt{2})}}{2(\sqrt{2})}$

$x = \frac{4 \pm \sqrt{16-8}}{2\sqrt{2}}$

$x = \frac{4 \pm \sqrt{8}}{2\sqrt{2}}$

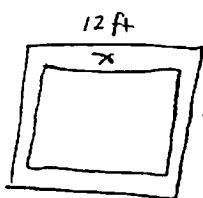
$x = \frac{4 \pm 2\sqrt{2}}{2\sqrt{2}}$

$x = \frac{2 \pm \sqrt{2}}{\sqrt{2}}$

$x = \frac{2\sqrt{2} \pm 2}{2}$

$x = \sqrt{2} \pm 1$

34)



$(2x-1)(2x-21) = 0$

$2x-1=0 \quad 2x-21=0$

$x = \frac{1}{2}$

$x = \frac{21}{2}$

$12(10) - (12-2x)(10-2x) = 21$

$120 - (120 - 44x + 4x^2) = 21$

$120 - 120 + 44x - 4x^2 = 21$

$4x^2 - 44x + 21 = 0$

The width of  
the border is  
 $\frac{1}{2}$  ft

35)



$14$   
let  $a = \text{original} =$   
 $\frac{a-319.2}{a} = .05$

$a - 319.2 = .05a$

$-319.2 = -.95a$

$a = 336$

$14x(x+2) = 336$

$14x^2 + 28x = 336$

32)  $25x^2 - 110x = -121$

$25x^2 - 110x + 121 = 0$

$(-110)^2 - 4(25)(121) =$

$12100 - 12100 = 0$

1 real rational  
solution

$14x^2 + 28x - 336 = 0$

$14(x^2 + 2x - 24) = 0$

$14(x+6)(x-4) = 0$

$14 \neq 0 \quad x = -6 \quad x = 4$

The present dimensions were  
 $14' \times 4' \times 6'$

36)

|             | Rate<br>per/hr  | # of<br>hrs | Job<br>completed |
|-------------|-----------------|-------------|------------------|
| (slower) #1 | $\frac{1}{x+1}$ | 3           | $\frac{3}{x+1}$  |
| (faster) #2 | $\frac{1}{x}$   | 3           | $\frac{3}{x}$    |

$$\left(\frac{3}{x+1} + \frac{3}{x} = 1\right) x(x+1)$$

$$3x + 3(x+1) = x(x+1)$$

$$3x + 3x + 3 = x^2 + x$$

$$6x + 3 = x^2 + x$$

$$x^2 - 5x - 3 = 0$$

$$x = \frac{5 \pm \sqrt{(-5)^2 - 4(1)(-3)}}{2(1)}$$

$$x = \frac{5 \pm \sqrt{25 + 12}}{2}$$

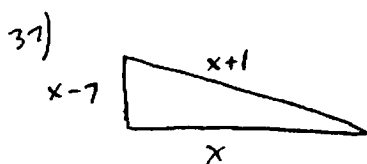
$$x = \frac{5 \pm \sqrt{37}}{2}$$

$$x = \frac{5 + \sqrt{37}}{2} \approx 5.5$$

$$x = \frac{5 - \sqrt{37}}{2} \approx \cancel{5}$$

$$5.5 + 1 = 6.5$$

It will take the slower gardener about 6.5 hrs to mow the lawn alone.



$$x^2 + (x-7)^2 = (x+1)^2$$

$$x^2 + x^2 - 14x + 49 = x^2 + 2x + 1$$

$$2x^2 - 14x + 49 = x^2 + 2x + 1$$

$$x^2 - 16x + 48 = 0$$

$$(x-12)(x-4) = 0$$

$$x = 12 \quad \cancel{x = 4}$$

The sides of the triangle are 12", 5" and 13".